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The Search for Sustainable Development: Reshaping the Market Economy, Business, and Cities in the United States

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INTRODUCTION

American society is heading down the path towards environmental and social bankruptcy. Americans consume vast amounts of resources at a rate faster than regeneration, rely on energy sources that pollute the air and water, and degrade the environment in the name of progress, growth, and expansion. The resulting society lacks connection to the natural world and instead defines value in material goods and profit, even at the expense of the environment or humans. America's cornerstone institutions, the market economy, business, and cities, lie at the heart of environmental degradation but also have it in their power to break American society of its destructive habits. The market economy fails to value the natural world in terms of its true importance to human welfare and existence. Business conducts production without considering consequences to the environment of the resources it extracts or the waste it puts back into it. Finally, these abuses manifest in the expansion and growth of cities that result in environmental destruction or the loss of community, place, and social responsibility.

Despite this dismal outlook for America, a new focus, sustainable development, has emerged that acknowledges the environment's value to human welfare. The formation of the President's Council on Sustainable Development in 1993 by President Clinton shows the importance of a national focus on sustainable development. If America is ever to achieve sustainability, however, it must focus on reshaping its cornerstone institutions. Therefore,

the market must be adapted to include the value of the environment to human welfare. Business must alter its production to operate under a system that works to eliminate waste. Finally, cities must break away from traditional development to instead focus on building environmentally-responsible and socially-just cities.

This honors thesis will explore America's cornerstone institutions: the market economy, business, and cities, and their unsustainable development practices. Next, it will offer sustainable development as a means to reshape these cornerstone institutions and make recommendations accordingly. Finally, it will look at two American cities, Las Vegas, NV, and Chattanooga, TN, in an effort to draw conclusions about current development and the potential of sustainable development for application at a national level.

AMERICAN MATERIALISM AND SKEWED VALUES

During a single day, Americans are bombarded by an average of 3,000 messages in the form of billboards, television commercials, magazine advertisements, clothing logos, and now internet ads that tell them how their lives could be better, worthwhile, and fulfilled if only they bought a certain product. With less than five percent of the world's population, the US uses 25 percent of the resources in order to fulfill its materialistic wants, setting a very unsustainable model for the rest of the world. According to the Northwest Environmental Watch, if the rest of the world mimicked the rate of the US, a rate of about 120 pounds a day per capita, three more Earths would be required to meet the demand on resources, as well

as an additional nine atmospheres to absorb the resulting greenhouse gases (Shurgot, 1997).

Excessive consumerism has significant impacts on human welfare. Wasteful consumption patterns lead to many environmental problems including land, water, and soil degradation; toxic substances; loss of biodiversity; resource depletion; air pollution; and loss of aesthetic, amenity, and spiritual values of nature and the built environment (C. Lant, personal communication, Spring 1998). However, the effects extend beyond the environment. Americans, lulled by the ease of credit cards, have been led into bankruptcy. The number of Americans unable to pay off their debt has more than tripled since 1981 and is currently around a million people (Shurgot, 1997).

Additionally, materialistic values leave Americans unfulfilled. According to the Index of Social Health, since the 1970s per capita umption has risen 45 percent, but quality of life has plummeted 52 percent (Shurgot, 1997). The American dream of liberty has been replaced with the ideal of prosperity. The majority of people's lives revolve around making money and judging themselves according to what they can show for their money, rather than quality of life indicators such as communal interaction (Ventura, 1995). Professor Robert Costanza (1987) explains this tendency in the form of social traps in which "the short-run, local reinforcements guiding individual behavior are inconsistent with the long run, global best interest of the individual and society."

What is surprising is that Americans may be aware of the negative effects of materialism. The Merck Family Fund, a Maryland-based charitable organization, in a 1995 public-opinion survey, found that Americans connected materialism with a skewing of values, a breakdown of social bonds, and the erosion of personal happiness. Most Americans are also aware that protecting the environment will require significant changes in consumption patterns (Shurgot, 1997). Therefore, it is necessary to strike an equitable balance between human consumption and the planet's capacity to support human life. However, the search for this balance will require more than just personal limitations of consumption (Wirth, 1995). It requires Americans to reexamine the markets that drive society, the businesses in which they work, and the cities in which they live. Striking a balance between human desires and the Earth's resources can be discovered through the process of sustainable development.

SUSTAINABLE DEVELOPMENT

Currently, American society's mechanism for judging its health is in terms of economic means. Society is considered to be "developing" if a rising level of real income per capita exists. This measure of societal wealth constitutes a "standard of living." However, "*quality* of life," the health of the population, educational standards, and general social well-being, remains largely absent from this equation (Pearce, Markandya, Barbier, 1996). Therefore, a better standard for evaluating society, as well as a goal to strive for,

is "sustainable development." Sustainable development is a process by which the general quality of life advances based on a social and economic system that respects the environment's value to human welfare.

Sustainable development has acquired many definitions over time. The most popular is offered by the United Nations. According to the United Nations, sustainable development is development that "meets the needs of the present without compromising the ability of future generations to meet their own needs" (Smith, 1996). A more precise definition might be "a process of improving social welfare globally that does not decrease the capital stock of useful human, infrastructure, and natural resources available for, and by, future generations on a per capita basis" (C. Lant, personal communication, Spring 1998).

Regardless of the specific interpretation of sustainable development, all definitions include three components. First, sustainable development emphasizes environmental maintenance through placing a significant value on the natural, built (roads, buildings, neighborhoods), and cultural environments. This increased valuation occurs either because environmental quality is seen as necessary to achieving traditional development, or environmental quality itself is seen as an important component of an improved "quality of life." Second, sustainable development emphasizes present and future needs, and therefore focuses on an extended time horizon. Finally, sustainable development calls for providing for the needs of the least advantaged in society (intragenerational equity)

while ensuring future generations are provided for (intergenerational equity) (Pearce et al., 1996).

Whatever the definition of sustainable development, it begins with a discussion of where global society should be headed, i.e. what things society values are essential to human survival in the present and necessary to protect for the future. According to the Political-Ecology approach to analyzing environmental problems, the socio-economic driving forces of society lead to biophysical changes in the environment, causing social consequences, which, in turn, stir a social response (C. Lant, personal communication, Spring 1998). However, what drives the cycle are the societal values that create society's social structure in the first place (J. B. Ruhl, personal communication, Spring 1998). Therefore, for sustainable development to occur, what society places value on must be restructured, because, as discussed later, much that sustains human life is not assigned value according to traditional development.

Sustainable development includes a number of dimensions that can be emphasized to bring about a greater quality of life. These dimensions include: 1) environmental: using flow resources so that consumption does not exceed regeneration, maintaining ecological functions, and avoiding environmental damage that is irreversible; 2) technological: creating new energy sources and eliminating wastes; 3) human: fostering attitudinal change and emphasizing greater social progress over pure economic growth; 4) economic: valuing natural resources as capital and incorporating their prices into the market; and, 5) political: ensuring needed policy change can be implemented successfully (C. Lant, personal communication, Spring

1998). These dimensions can best be realized by focusing on three basic components of society: the market-economy that drives people, the businesses that support them, and the cities that shelter and sustain them.

REEVALUATING MARKET ECONOMIES

Under market economies, decision-making powers belong in the hands of private sector companies. They compete to sell products and services and attempt to maximize profit through product expansion and diversification, technological innovation, and reducing labor costs. The ultimate aim is to accumulate as much capital as possible (Hartmann, 1996). According to Adam Smith, the goal of the capitalist business person is "only his own gain" (Coleman, 1994). For capitalism to exist, there must be significant ownership of land, buildings, and resources. More importantly, "things" must be commodified to be sold on the marketplace (Hartmann, 1996). Resources do not technically exist until they are drilled, extracted, pumped or cut. Success and ability to grow are measured solely in terms of profit (Hawken, 1993).

In the drive to maximize profit, businesses seek to reduce costs. Businesses often avoid costs by transferring them onto society. Costs and financial impacts fall on society rather than on the responsible business in the form of externalities. Opportunities for externalities are readily available to polluters in the form of rivers for liquid wastes and the air for gaseous waste (Coleman, 1994). For example, when new tires are sold, the cost includes the price of

materials, labor, and a profit for the producer. However, this cost does not include cleaning up the air pollution associated with the tires' production, nor the effects of acid rain or health problems caused by the pollution (Smith, 1995). When opportunities for externalities do not exist naturally, the federal government is able to accept specific waste as a public (external) cost rather than a private cost, as they have done for the nuclear industry and radioactive waste. Then the responsibility falls on society to deal with the problems associated with radioactive waste and its disposal (Coleman, 1994).

Capitalist theory originally presumed that traditional community values and ethics would provide a framework within which capitalism could exist. Communities in the pre-industrial era were interdependent and characterized by the community's commitment to the continued livelihood of its citizens over contractual agreements and debts. This social morality was essential to the development of capitalism. However, capitalism slowly eroded that morality as it instilled the ethic of following one's self-interest to ensure the greatest good (Hawken, 1993).

Market economies run on capital. Capital can be described as the stock of materials or information that exists at a particular point in time. Each form of capital stock generates, either alone or in conjunction with other stock, a flow of services that, when used to transform materials, enhances the welfare of humans. The original capital stock may not remain intact (Costanza et al., 1997). Capital stocks exists in different identifiable forms. It includes the physical, manufactured capital such as machines and building, the social

capital such as human bodies for social production and information stored in human brains for social reproduction, and finally, the natural capital such as harvestable resources (trees, minerals, fossil fuels) and ecosystem services (C. Lant, personal communication, Spring 1998).

Ecosystem services are the conditions and processes through which nature's ecosystems sustain and fulfill human life through the production of natural capital such as trees, fossil fuels, minerals, fiber, and pharmaceuticals. They also provide basic human life-support functions, such as cleansing, recycling, and renewal, as well as many intangible aesthetic and cultural benefits (Daily, 1997). When combined with manufactured and human capital services, they produce human welfare. The probability that human welfare could be produced without natural capital is virtually nil. Consequently, natural capital can be considered essential to human welfare. In other words, the absence of natural capital and ecosystem services implies the absence of human welfare because no feasible substitutes exist (Costanza et al., 1997).

Despite natural capital's value to human welfare, this value is not captured in market systems. It has a zero price simply because no market exists in which to assign it its true value. In other words, natural resources are provided "free" because their ultimate value to the biosphere and to human welfare is not valued in markets. Costs associated with resource use and degradation are passed onto society in the form of externalities (air and water pollution, toxic substances, soil erosion) and a diminished capacity of the earth to meet human needs (diminished erosion control, disruption in the carbon cycle,

reduced waste treatment capacities). According to the laws of supply and demand, if something is provided at a zero price, more of it will be demanded than if it was valued at a positive price. The danger of this lack of valuation is that this greater level of demand will be unrelated to the capacity of ecosystem services to meet this demand. By assigning natural capital a zero price, no incentive exists to protect it even though it serves economic functions that have positive value (Pearce et al., 1996).

Market economies operate under a single decision criterion which leads to a single goal: profit. As profit is maximized, all other values, environmental as well as social, become secondary. Communities, political systems, cultural institutions, and ethical norms are pressured and over time may be lost or perverted in the ultimate drive for self-interest. Basic human needs are also de-emphasized as a greater materialistic value is placed on luxury goods, such as CD players, that indicate the status of the owner, than on essential material goods such as food and clothing. Profit may also be earned from products that are socially or environmentally destructive, such as cigarettes and chemical pesticides (Coleman, 1994).

Capitalism does not differentiate between renewable and nonrenewable resources. It does not factor in depletion of resources, exploitation of living beings or places, or lives lost. In other words, capitalism does not discern whether the profit is one of quality to human welfare or the environment, or mere quantity. Because natural capital is given a zero price, future scarcity or disappearance is not factored in as long as the supply is plentiful today (Coleman,

1994). In the business race for "survival of the fittest," the winners are the companies who consistently overstep and exceed carrying capacity (Hawken, 1993). Carrying capacity can be defined as the "population [the earth] can sustain over a long time period" (Smith, 1995). Carrying capacity becomes threatened as renewable resources are used at a rate that exceeds their regeneration or nonrenewable resources are exhausted. Consequently, market economies fail to recognize costs to future generations, the environment, and to humans. (Hawken, 1993).

Under capitalism, there is a need for constant growth to increase accumulation (Hartmann, 1996). Growth is measured in terms of rising real incomes (Pearce, 1996). Growth is considered always possible through resource extraction and technology, given sufficient capital and will. There are no limits to future expansion (Hawken, 1993). This imperative for growth is intertwined with the modern faith in the power of technology. The need for profit will lead to the rapid acceptance of new technologies that might increase profit margins. This pressure to bring new products quickly to the market ultimately hurts both science and the environment. Science becomes subservient to industry, rather than guiding it, as even human life is devalued in the race for growth and profit (Coleman, 1994).

A RESTORATIVE ECONOMY

To create a restorative economy requires people to recognize and accept that business must be a system of allocation that reflects

the true value of natural capital and ecosystem services, and "attempt(s) to reflect in commerce the interwoven, complex, and efficient models of natural systems." In such an economy, viability is determined by the ability to integrate with or replicate cyclical systems through production and distribution. Many of the fundamentals of the current system would be inverted so that restoring the environment and making money through innovation and competition would be the same process (Hawken, 1993).

Traditionally, it was believed that one could have economic growth, *or* environmental quality. Any attempt at compromise meant trading-off some amount of one for the other. However, sustainable development shifts the focus away from growth *versus* the environment to a focus on the complementarity of growth and the environment, i.e. from a focus on rising real incomes to an emphasis on the quality of life. Environmental quality can actually improve economic growth by: 1) improving the health of the workforce; 2) creating jobs in the environmental sector (recreation, tourism); and 3) creating jobs in the pollution abatement sector (air and water pollution control equipment, clean-up campaigns, recycling) (Pearce et al., 1996).

Markets operate beneficially only when they reflect real costs, and detrimentally when they are artificially low, and falling. For example, American food is the cheapest in the world, but its price does not reflect the significant reduction in topsoil from an average of twenty-one inches to six inches over the past hundred years, the contaminated ground water, or the poisoned wildlife from the use of pesticides. When prices do not reflect these costs, real income is

effectively raised and consequently people do not have the incentive to consider waste, frugality, product life, or product substitution. When prices reflect the true cost of items, people will have to reconsider usage patterns (Hawken, 1993).

Robert Costanza et al. (1997) has estimated the value of ecosystem services to global human welfare to be in the range of $16-24 trillion per year, with an average of $33 trillion per year. Global gross national product is approximately $18 trillion per year. In other word, 65% of benefits to human welfare come from ecosystem services which are valued at a zero price. Because the price mechanism has recorded natural capital as "free goods," resources can become degraded faster than they regenerate. Therefore, the market should be modified to ensure that the value of ecosystem services and natural capital are incorporated into the price of goods and services (Pearce et al., 1996).

The market must be altered to create a price-cost integration system that does not affect individuals' real income. Under such a system, rewards would come for internalizing costs rather than externalizing them. There are two types of costs that must be internalized through taxation. First of all, the "spillover effect," the actual damage caused by one production system to another system, person, or place, such as the immediate health risk and/or death of wildlife as a result of dumping industrial waste into a river, must be internalized. The second cost, is the unknown cost to future generations, as in the case of deforestation, soil erosion, and groundwater depletion. Much environmental harm, such as radiation and persistent pesticides, cuts across both categories. The incentive

to lower costs is a driving force in production today. Through the creation of a cost-price integration system, an incentive to lower costs will still dominate, however, it will lead to better product design as producer's will have to bear their own costs (Hawken, 1993).

The market also must be adapted to mimic the green plant cell and run on solar income. Currently the industrial system is run on extracted reserves (Hawken, 1994). To accommodate the vast population in the next century, a dramatic change in the energy supply structure is necessary. Fossil fuel consumption must be reduced urgently while it is still a viable resource. The alternative to fossil fuels is renewable (solar-related) energy sources, including solar, wind, hydro, and biomass. With major technological advances made in the past few years, these sources could presently begin to replace fossil fuels in the energy market (Lovejoy, 1996).

REFOCUSING BUSINESS

Business has two forces acting upon it: the drive to underprice and outsell competitors, and the urgent social call for it to internalize the expense of acting more responsibly environmentally and socially. To be successful does not require the recognition of carrying capacity or sustainability. Succeeding in business is like "winning a battle and then discovering that the war was unjust." On the other hand, those who acknowledge responsibility for the environment, are handicapped financially by bearing the costs from which competitors

growth leads to increased laborsaving technologies in order to increase accumulation. It is a vicious cycle that takes no regard for social or environmental productivity (Henderson, 1996).

ECOLOGICALLY-RESPONSIBLE BUSINESS

Business offers the promise of increasing the general well-being of humankind through service, innovation and invention, and environmentally and socially-responsible values. Making money is absolutely meaningless on its own terms and a simplistic, insufficient pursuit in the search for a better society in a decaying world. An increasingly widening gap exists between the rapid rate at which society and the natural world are decaying and the painfully slow rate at which business is making any truly fundamental change (Hawken, 1993). However, business is blessed with the resources, technology, global reach, and ultimately the motivation to achieve sustainability (Hart, 1997).

Business must first reorganize so that it reflects nature's cyclical system. The first step is to obey the waste-equals-food principle in order to ultimately eliminate waste from industrial production. Nature constantly recycles detritus to nourish and replenish other systems with a minimum of energy and inputs. An ecological model of business would require all waste to have value to other modes of production so that everything is reclaimed, reused, or recycled (Hawken, 1993). If the whole system of production is redesigned to be as clean and efficient as possible in order to minimize waste, rather than another fruitless attempt to reduce

pollution through end-of-pipe treatment, then the drive to be the most efficient would lead to financial as well as environmental gains (Smith, 1996).

An environmental strategy to minimize or eliminate waste must include three aspects: pollution prevention, product stewardship, and clean technology. Most companies currently focus on pollution control, in which waste is cleaned up after it has been created, rather than pollution prevention, which focuses on eliminating as much waste as possible from production. Pollution prevention strategies rely on constant examination and continuous improvement efforts (Hart, 1997). No longer will doing business unburdened by real connections to cycles, climate, earth, or nature be acceptable (Hawken, 1994). The second aspect, product stewardship, focuses on minimizing waste and the environmental impacts associated with the full life cycle of a product. Reducing the use of materials and production will require fundamental change in underlying product and process design (Hart, 1997). Producing goods for quantity rather than quality will no longer be profitable as companies compete to create the most innovate products (Hawken, 1993). Finally, business must make a switch toward clean technology by planning for and investing in tomorrow's technologies (Hart, 1997).

Dr. Michael Braungart and Justus Englefried of the Environmental Protection Encouragement Agency (EPEA) in Hamburg, Germany, have proposed an "intelligent product system" that takes pollution prevention, product stewardship, and clean technology into account. Exemplifying nature's cyclical system, this

plan eliminates waste altogether and divides products into three categories: consumables, products of service, and unsaleables (Hawken, 1993).

Consumables are products that are used and consumed, and then discarded after only a short time. Under the EPEA's proposal, for a product to be classified as consumable, its waste must be wholly biodegradable, able to become food for another organism with no toxic residue that would cause harm or accumulate. In other words, it would have to be capable of turning back into dirt without causing harm during the process. Most food currently falls into this category, except for food tainted with persistent pesticides. Other products that currently do not fall into this category easily could. Many clothing and shoes are produced with certain chemicals and metals which could be eliminated from the process so that they could break down when discarded (Hawken, 1993).

Products of service include durables, such as appliances, and non-durables, such as packaging. Their importance tends to be in the service they provide, rather than in the ownership of the product, such as transportation from a car and entertainment from a television. Under the intelligent product system, products would not be sold but rather licensed to the purchaser. Although the manufacturer would retain ownership, the purchaser would be able to transfer the license by selling it or giving it away. However, the product could not be disposed of. It instead would be returned (or picked up) by the manufacturer or retailer. Retailers would become "de-shopping centers" where products would be dropped when no longer needed and new ones could be obtained (Hawken ,1993).

Manufacturers would view products in an entirely new way, designing products for complete and easy disassembly for reuse, remanufacture, or reclaiming. Products would be designed for their value as they go out the door but also come back in. Currently, when a television is purchased, the customer acquires 4,000 chemicals, 10 to 20 grams of mercury, and an explosive vacuum tube. There is no safe place to dispose of televisions and transporting over twenty televisions in a truck requires a license from the EPA for hauling toxic waste. However, if the television can be returned and reassembled into another television then it is no longer waste (Hawken, 1993). Consequently, the companies who are the most creative and innovative with regard to the environment will be the most successful.

Every time a product is manufactured it literally means going back to the well and starting over. However, products of service can be created and recreated in increments that extend their life far into the future and therefore require less energy. However, more labor will be required (paid for by using less waste energy) so employment will rise along with profits for the most innovative products. Manufacturers will benefit from customer loyalty as purchasers who turn in old products may develop loyalty to certain companies and continue to go back (Hawken, 1993).

Finally, unsaleable products constitute toxic chemical, radiation, PCBs, and heavy metals. These products cannot be integrated into the cyclical process without causing harm. The intelligent products system works toward designing unsaleables out of consumables and eventually from all products of service. As unsaleables are phased

out and replaced, they must be stored safely and with effective storage methods. The EPEA proposes that they be stored in "parking lots," sites owned by the state or other public authorities and rented to the polluter. All toxic chemicals, except radioactive products, can currently can be stored safely in a secure container in liquid form. Therefore, they should be stored rather than burned or dispersed for lack of methods to detoxify or recycle them. Storage charges would be the responsibility of the manufacturer and communities would only have to deal with organic waste in their landfills. Industries would also have the incentive to devise alternatives to the use of these chemicals and technologies for the detoxification of them (Hawken, 1993).

The intelligent product system is a cradle-to-cradle system so that every product or by-product is imagined in its subsequent forms before it is produced. Future uses and the avoidance of waste are factored in from the beginning. Intelligent products are a radical breakaway from current manufacturing processes because they attack the root causes of pollution and toxicity. Responsibility belongs to the manufacturer as well as the user (Hawken, 1993). Although some costs may be transferred onto the consumer, these costs will reflect the "true" cost of production, comprising the normal costs of production as well as the value of natural capital and ecosystem services to human welfare (Pearce et al., 1996). By placing the majority of the cost and responsibility with the manufacturer, however, immense incentives are created for companies to redesign and reimagine their business and products. Today's wasteful methods of production are used because they are

the cheapest. Only when the incentives are placed on sustainable production will waste be eliminated (Hawken, 1993).

REVISITING CITIES

Markets that do not value natural capital and ecosystem services according to their true importance to human welfare, and linear productions systems that degrade the environment and exhaust resources, are manifest in the development of cities. Cities are driven by this old model of economics and business, resulting in urban development that is environmentally-destructive, socially-unjust, and ultimately unsustainable.

The Historic City

Traditionally, towns and cities have been tied to local economies which depend on the constraints of the land and climate, building materials, and the social and historic forces unique to each time and place. Communities formed from the necessity to solve the practical problems of shelter, town building, and daily living. Agricultural and building technology, native materials, climate, soils, and established traditions served as the limiting factors in the vernacular landscape (Hough, 1990).

In the colonial era, the US was a rural country with small and scattered settlements. The earliest settlements were in the form of towns that revolved around an agrarian subsistence economy (Cullingworth, 1997). A sense of regional identity developed from the social and institutional linkages that tied people to one place and

determined how they should live their lives. A necessary connection to the land involved investing in it from the need to depend on it. People understood the environment close to where they lived but not beyond it. Preindustrial landscapes were working environments characterized by the relationship between land and settlements. The land supplied the food and materials for the community, which in turn returned the by-products to the land. The result was a close-knit physical, social, and economic relationship through necessity. The visual edge between town and countryside, a consequence of productive, economic, and functional connections, was clear and well-defined. The town took its character from its regional setting.

Post-War Development

Postwar development created a landscape of transportation systems, freeways, vacant lands, and suburbs that are continually expanding into the diminishing rural areas (Hough, 1990). The physical characteristics of American cities can easily be identified; they are large in scale, deconcentrated, and homogenous. Large-scale building projects, office buildings, apartment clusters, suburban communities, and vast industrial sites characterize post-war development (Fowler, 1992).

However, these large-scale features have not been placed close together but instead have sprawled over more and more miles of land. Consequently cities have become deconcentrated and decentralized. City-dwellers sought an escape from the noisy and crowded city for front lawns and backyards, places for children to play and parents to garden. This escape came true for many

Americans in the 1950s and 1960s; by the 1970s more people lived in the suburbs than in the central cities or the countryside. The new suburbanites demanded extremely low densities (Fowler, 1992).

As people moved to the suburbs, the downtowns became less concentrated, creating the need for roads to connect peoples' homes to their workplaces. Because the densities of new developments were so low to allow for the use of public transport, the car became indispensable and highways, streets, and parking lots swallowed up the city in order to accommodate the car. "Urban expressways take up ten acres a mile and thirty acres an interchange, and each car needs 280 square feet of parking space, which works out to be 173 cars per acre" (Fowler, 1992).

Post-war development was also homogenous. Building booms, responding to population pressure, created block after block of the same type of architecture. Development was not only homogenous with respect to building but also with respect to land use. This dimension of homogeneity is ultimately connected with scale and concentration. As the scale of building projects increased and as they became more spread out, people had to drive or walk some distance "to experience a different kind of economic activity." Consequently, the city's land uses have often become separated into very large, functionally homogenous, areas (Fowler, 1992).

Economic Dimensions

Transportation Costs

Post-war development has been consumed by streets, highways, and parking lots. This elaborate transportation network

has not been without cost. These high costs arise not only from deconcentrated development, but also from segregated land uses, causing daily activity to be geographically separated. Disjointed activities create the possibility of exclusively residential neighborhoods, large-scale shopping centers, and freedom from the daily sight of noxious industry. However, they also create the necessity of urban transportation.

The need for urban transportation has risen with the change in the scale of activity clusters. Historically, work, recreation, and home-life may have taken place under the same roof. After the sixteenth century, however, areas of a city would be reserved for a specific function, including religious, financial, political, and industrial. Consequently, the need to travel to work and market arose. As improvements in transportation paralleled increases in the scale of activities, the cities of the eighteenth and nineteenth centuries expanded immensely. Land was swallowed up at an amazing rate as commercial and industrial uses displaced inner city residential neighborhoods by outbidding the residents for the prime locations. Transportation played a crucial role, initially through "streetcar suburbs", then subdivisions accessible only by car, and finally industrial parks and shopping centers connected by superhighways. Development and transportation have resulted in modern cities where we sleep in immense residential complexes and work in immense commercial and industrial complexes -- and spend our lives traveling between them (Fowler, 1992).

The economic consequences of large-scale, deconcentrated, and homogenous urban development are cities that must spend more

money to build and maintain transportation systems than cities built prior to the 1950s which are more compact with mixed land use. William Michelson, an urban sociologist, conducted a study on the habits of people who had recently moved to a new residential area. He found that suburban homeowners traveled a much greater distance for food, clothing, and sundries than downtown residents. What this suggests is "that the more a city mixes its residential and commercial land use, the less money the government and its citizens will have to spend on transportation services" (Fowler, 1992)

Urban transportation is also expensive because expressways, streets, parking lots, and rapid-transit lines require a significant amount of land. In a car-oriented city like Los Angeles, the streets and parking lots can take up two-thirds of the downtown land. City governments build thousands of parking spaces and hundreds of big wide streets, even though the land in the core of a city is often valued at hundreds of dollars per square foot. Private benefits, such as shorter trips for commuters and parking convenience, are continually put ahead of social costs. Land surrounding the downtown core becomes devoted to transportation because it is undervalued by governments, consequently depriving citizens of millions of dollars of possible land development (Fowler, 1992).

Other costs of urban transportation are difficult to pin down. One cost is the cutting-off of circulation, or what Jane Jacobs refers to as a border vacuum. The through transportation route creates cul-de-sacs and dead-end streets which rob areas of the traffic that feeds social and economic life. An expressway can serve to turn a previously good location for a store into a bad one. Expressways also

impose economic costs on nearby residents by creating noise. Property values have been shown to decrease by up to 6.7 percent as a result of expressway noise (Fowler, 1992).

A final cost of urban transportation and car-oriented cities is immense pollution. The cars Americans use to travel on the vast transportation networks consume immense amounts of fuel. Automobile exhaust has many effects on the environment from air pollution, the emission of ozone, and acid rain. These problems contribute to forest and crop degradation as well as significant effects to human's respiratory health (C. Lant, personal communication, Spring 1998). In a study conducted by two Australian geographers, Peter Newman and Jeffrey Kenworthy, they made a direct connection between the densities of cities and gasoline consumption. They found that cities that have a high density of jobs without residents, requiring people to travel some distance to work, such as Los Angeles and Houston are "not only doing more to kill their own residents with air pollution; they are doing more to kill the planet" (Fowler, 1992).

Municipal Services Costs

Because land-uses have been separated, municipal services become more expensive. For example, water must be transported a long distance to provide clean water to homes and industries and sewage water must be carried away. The further it has to be transported the greater the price. Exclusively residential suburban communities are almost totally dependent on the outside, city services. The considerable cost to transport goods and services are

not only borne by the resident but also by local governments. Ironically, the offices and factories that remain in the cities that are busy with activity during the day, become silent at night -- along with the city's services. By segregating work activities from residential and recreational activities, specialized sets of urban services have been required for each activity. A final cost results from the repairing and rebuilding of the immense miles of sewer, pipes, utilities, and other parts of urban infrastructure (Fowler, 1992).

Social Consequences

Post-war development did not only create economic effects, but also had social consequences. "North Americans bought what they wanted, namely, exclusively residential areas, but it cost them more than money." According to Theodore Lowi, suburbs represent a failure of citizenship. Edmund Fowler explains,

> We have removed ourselves not only from the responsibilities of civic participation but also from the challenges of social relation by zoning poor families out of our neighborhoods. The social and political skills of adults have declined; we have lost the ability, at a personal level, to say how we feel, to negotiate, to solve problems creatively -- in short, to be publicly responsible individuals.

The interactive city pedestrian environment of sidewalks, shops, and restaurants has been replaced by a series of isolated events, points of activity between home, shopping, recreation, and work made accessible by a maze of highways. The streets are full of cars but empty of people. The street therefore, becomes a separator rather than an integrator of people. The mall has pushed aside Main

Street as the core of the community, a necessary response to the loneliness created by sprawl. Parking is placed in full view along highways because it is the key element that generates sales for the numerous shopping areas. Because contact with the street as a social environment has been eliminated, social interaction has instead become transplanted to shopping malls, indoor racetracks, pool-halls, and bars (Hough, 1990).

The social consequences of sprawl are not limited to the suburbs. The less mobile, poorer groups are abandoned and isolated and forced to deal with a decaying infrastructure ("Onwards and Outwards: Cities," 1994). The irony is that as land is developed prematurely, the areas left behind often have more of the assets considered important for long-term growth and strong communities: reasonable density, proximity of shopping to housing, good transport networks, and mixed-use land patterns (Konvitz, 1996).

Environmental Consequences

The once natural landscape that dominated traditional American towns and cities, swallowed up by freeways, suburbs, vacant lands, shopping centers, and endless miles of transportation systems, has resulted in lacking of distinct variation between one place and another. The remaining landscape is now fragmented *within* cities in river valleys, remnant ravines, ponds, and patches of farmland. The conditions that created the pre-war identity and character of the urban environment have been lost to suburban expansion that defines land's value in terms of real estate (Hough, 1990). Urban sprawl seems to defy any sense of organization and

integration typically found in downtown areas (Anderson, Kanaroglou, & Miller, 1996).

The defining characteristic of the suburb is its lack of identity. No recognizable connections exist with its natural surroundings, and architecture becomes confined to the single expression of the isolated building. There is little continuity of the built or natural environment. The remaining urban landscape that exists in the form of parks and gardens has come under a universal design standard that displaces a sense of place and ecological diversity with horticulture. Native woods and plant communities are replaced with the best-selling exotic alien species in the nursery catalog that "deny the creation of a context between what is old or indigenous and what is new" (Hough, 1990).

With little to reflect the continuity of the built or natural environment, there can be little recognition of climate. Artificially maintained climates in shopping malls and office buildings, decorated with tropical plants and fish simulate make-believe worlds with no connections with the cultural and ecological realities of a particular place. The perfect, consistent temperatures and horticulture within these detached worlds of experience deny sensory contact with the environment. A mirage of the perfect environment with unlimited technology and energy resources results and residents feel no sense of place with their community and environment (Hough, 1990).

The Sustainable City

The ultimate goal of sustainable cities is to create cities that sustain and enhance the quality of life of their population and environment without detracting from other communities, human and nonhuman. According to Elizabeth Kline, director of the Tufts University Center for Regional Sustainability, a sustainable city is a specific settlement dedicated to ecological integrity, economic security, quality of life, and empowerment with responsibility. These priorities appear integrated throughout a city's specific goals for development. Sustainable cities focus on the interrelationships among all members and interests in society and question what people need to learn about each other so they can be more effective in improving their lives and the places they live (Barber, 1996). Finally, they formulate goals based on respect for the natural environment and humans, and use technology and planning accordingly (Geis & Kutzmark, 1995). Based on professional perceptions, as well as observed achievements, sustainable cities tend to focus their development on a number of areas, including environmental responsibility, citizen unity, public places, natural landscapes, historic preservation, ecological industry, local commerce, participatory democracy, and social responsibility.

Environmental Responsibility

Sustainable cities acknowledge environmental constraints and seek to reduce air and water pollution and the consumption of

nonrenewable resources. Resources are used at the rate at which they are generated and greater use is made of renewable sources of energy. Energy budgets can be balanced by increasing energy income from renewable sources such as solar, wind, wave, and small-scale hydro-electric, and by reducing energy expenditures. Policies can be implemented that promote renewable energy sources in both public and private buildings (Grant, Manuel & Joudrey, 1996).

Sustainable cities also attempt to reduce municipal solid waste through curbside recycling. Curbside programs can encourage residents to save waste material to use for composting. Additionally, local clothing and furniture exchanges can facilitate the reuse of large-scale household items (Grant et al., 1996). Finally, sustainable cities try to limit the wasteful consumption of land by fostering more compact and contiguous development patterns. Urban growth boundaries are imposed to contain sprawl and protect open space. In turn, higher average densities help to achieve the goals of sustainability including energy conservation and sensitive lands protection (Beatley & Brower, 1993).

A United Citizenry

Building sustainable cities requires more than acting environmentally responsible. They must be united by "a sense of mutual support, by a shared culture and way of life, by shared values, and by a historic rootedness in a place called home." Ecological cities, in turn, must orient human society to natural life, based on an understanding of a particular place or region. Each community member must make a commitment to "place" and

therefore develop a way of life unique to the particular region in order to ensure sustainability (Coleman, 1994).

Public Space and Integrated Land Use

Sustainable cities, and commitment to them, will never be achieved without community planning. Sustainability recognizes that humans require use of the environment in their daily lives, and therefore strives for healthy cities in which residents meet their needs for subsistence, shelter, security, participation, and a healthy environment (Grant, et al., 1996). The first step is to humanize cities. This involves the creation of common ground for the community to meet and interact, such as parks, squares, sidewalks and plazas. These areas should be enhanced with benches, native plants, sitting areas, artwork, and window displays. Today the commons has been displaced by shopping malls, gated communities, and private clubs. Postwar zoning laws must be amended to allow housing in commercial areas and neighborhood-serving commerce in residential areas (Lyman, 1997).

A community environment requires a suitably human scale and the integration of activities and uses, such as the ability to walk to shopping and the close proximity of home to work (Beatley & Brower, 1993). It also requires streets, pedestrian paths, and bike paths that connect all destinations and encourage these forms of transportation (Corbett, 1997). More resource-efficient transportation alternatives create the opportunities that most people desire -- access to people and services, and connection to the natural environment ("Principles of sustainability," 1996). The integration

of public space, mixed-land use, and alternate transportation results in a civic commons that is connected to the landscape and creates a place for the "practical integration of diverse places and people" and the appreciation for the natural environment of their local region (Lyman, 1997).

Natural Surroundings

The next step towards building sustainable cities involves recognizing the city's relationship to its natural surroundings and the importance of nature's systems to human welfare. Natural and human environments interact in a holistic system, in which individual components affect and cause change in the whole. Therefore, the built environment should be designed in such a way to support and complement the natural environment (Geis & Kutzmark, 1995).

Recognizing their ecological and aesthetic importance, native plants and landscapes should be considered and enhanced rather than detracted from or destroyed. The natural environment is crucial to the creation of common places (Lyman, 1997). Native landscapes can be preserved in the form of parks which may serve as community focal points. Parks may serve as "a centerpiece for economic development initiatives, a place of serene beauty and contemplation, and a showcase and habitat for local plant and animal species" (Geis & Kutzmark, 1995).

Preserving the natural environment also improves the urban environment by reducing environmental hazards. Provisions for water bodies in parks and protection of wetlands can be utilized as

catch basins for stormwater runoff to reduce the risk of flooding, or the damages associated with flooding, as well as a treatment system for stormwater to mitigate pollution. Additionally, planting trees in cities not only adds to the aesthetic value of the city, but also can reduce cooling costs, absorb pollutants, and act as windbreaks and noise barriers. Urban gardens create aesthetic value and public space as well as improve the economic livelihoods of low-income groups (Satterthwaite, 1997).

Cities that recognize their interdependent relationship with the natural environment consequently value the life cycles and the ecosystem functions and services that support them. The natural environment sustains human communities through the viability, continuity, and renewability of these cycles and, in turn, the built environment can support these cycles through neighborhood preservation, wetland management, and habitat conservation. By respecting the diversity of nature and its necessity to human life, people also recognize the importance of human diversity. Just as sustainable cities integrate the various elements of nature into the built environment, they assign the same importance to integrating human populations into a sense of community (Geis & Kutzmark, 1995).

Historic Preservation

Sustainable cities also recognize the indigenous aspects of their culture and history. They recognize that the built environment grows up around such traditions as the village green, the local church, and Main Street (Geis & Kutzmark, 1995). Therefore, in

order to celebrate a city's origins, as well as work for its future vitality, historic and local building styles should be revived. Historic buildings typically have employed materials and styles appropriate to the regional climate. Coherent local building styles also help to unite diverse people and therefore differences among people -- race, income, and social status -- become less evident than the shared sense of community identity (Lyman, 1997). In fact, in Los Angeles, a city characterized by its urban sprawl, many suburbanites are moving back into old neighborhoods, lured by the big, architecturally diverse, and relatively inexpensive houses ("The Past Once Happened Here: America's Megalopolis," 1997).

Restored historic areas also benefit cities by creating tourism dollars. Tourism, after health care, is the second largest employer in the US, as well as the third largest retail segment, with sales over $400 billion. Although much of the revenue is generated by monoliths such as Disney and Universal Studios, historic communities within larger cities are capitalizing on their cultural and historical resources. According to market research, "heritage tourism" provides the kind of experience most Americans feel are currently lacking in their lives, a chance to experience the slower, less-calculated lifestyles that once characterized American culture. Local businesses feel the benefits of restored historic districts. In 1995, more than 165 million visitors to historic areas stayed an average of a half-day longer and spent an average $62 more than travelers to other areas (Long, 1997).

Enriched Local Commerce

Sustainable cities are not only environmentally sound but economically vibrant in which economic activity is regenerative toward the environment. Economic activity does deplete a city's environmental assets and services but maintains, replenishes and enhances them over time (Potapchuk, 1996). They operate as relatively stable systems, importing as little energy and materials as possible (soil, water, food, etc.) (Grant et al., 1996). However, sustainable cities also replenish and enhance their local economies. Public areas integrated with shopping should be dedicated to local commerce including farmer's markets, specialty stores, locally-owned restaurants, and historic sites (Lyman, 1997).

Eco-Industrial Parks

Crucial to the development of sustainable cities is the building of eco-industrial parks. Eco-industrial parks attempt to replicate nature's cyclical system through a collaboration of businesses that reduce pollution and waste, and save money by feeding off each other's energy, water, and material byproducts. The idea originated in Kalundborg, Denmark where a park has evolved since the 1970s (Dwortzan, 1998). At Kalundborg, the power plant burns the waste gases from the oil refinery, and the oil refinery passes its coolant water on to other companies, thereby reducing overall water consumption by about 25%. The power plant's air scrubbers produce gypsum for a cement company to produce wallboard. Finally, excess steam from the power plant heats 50 commercial fish ponds, neighboring companies, and many of the town's homes (Epstein,

1998). The participating companies have saved millions of dollars annually (Dwortzan, 1998).

Since 1993, more than 20 US cities have initiated plans to develop parks similar to Kalundborg's. While most are still on the drawing board, a few have begun operation. The 500-acre Port of Cape Charles Sustainable Technologies Industrial Park in Cape Charles, VA, was the first eco-industrial park in the US. It opened in 1996 with two anchor businesses. A multi-tenant building is planned to open by the end of 1998 with an additional four tenants that currently employ "green" technologies (Dwortzan, 1998).

Because some companies may be unwilling to relocate to a park, the 2200-acre Fairfield Ecological Industrial Park in Fairfield, MD, is taking a regional approach. Rather than seeking companies who already practice green manufacturing, the park has established waste exchanges involving 160 companies within and beyond the park's boundaries who seek to make their practices more environmentally sustainable. The Brownsville-Matamoros Eco-Industrial Park in Brownsville, TX, takes a different approach by eliminating the site altogether. This strategy, although requiring higher transportation costs, avoids expensive land purchases, complex tenant interdependencies, and difficult relocations. Using a computer model, 30 companies within a 15-mile radius are targeted for byproduct exchanges (Dwortzan, 1998).

Shared Governance

The ability of a city to undertake the process of planning and creating sustainability greatly influences how successful the city will

be in achieving its goals. This process will fail to take root unless it becomes the concern of the local government, in developing and implementing policies based on the needs and priorities of their citizens. Every decision affects a city's capacity to meet the demands of the complex interaction of sustainability. Consequently, rather than trying to specifically define sustainability, local governments should envision it. This allows for flexibility in the face of a city's changing needs and priorities. Out of this vision arises the specific goals a city would like to work for at a particular time and allows the government to be proactive to prevent threats to the city's well-being and to maximize positive opportunities (Geis & Kutzmark, 1995).

Planning goals should be led by the local government in order to avoid developer-initiated, piecemeal plans for the city (Corbett, 1997). Government leaders should set directions, reshape programs, change roles, and provide an ongoing presence critical to long-term development. However, although local governments should remain the steadfast leaders, they are increasingly realizing their role as "facilitative, catalytic change agents galvanizing participatory efforts that bring institutions and citizens together for mutual gains" (Potapchuk, 1996).

To truly achieve sustainability, cities must strive for a shared vision, built collectively by local government, citizens, nonprofit organizations, and the business community. Through such a collaborative effort, disconnected initiatives can be linked and a sense of direction can be provided. Harnessing their resources and capital in a synergistic fashion creates a participatory democracy in

which citizens become the central element in determining the future of their city. Additionally, strengthening the citizen-to-citizen connection builds political consensus, strengthens neighborhoods, improves intergroup relations, and fosters the neighborliness that is at the root of strong sense of community (Potapchuk, 1996).

In order to implement sustainability, local governments should map out a number of practical steps:

- Establish goals, from general to specific.
- Determine specific areas to target sustainable development efforts, including neighborhoods, a central-city commercial area, or a transportation system.
- Identify indicators of success, and ensure these indicators are consistent with city goals.
- Foster consensus and collaboration from the city's residents, media, businesses, civic groups, grassroots organizations, and schools.
- Develop a strategic plan for achieving the city's goals. This should include specific objectives and priorities, the time frame for accomplishing them, the process through which they will be carried out, the people who will be involved, and methods to build support and publicize achievements.
- Develop design guidelines to use in the planning process. Each guideline should relate clearly to the city's goals and include state-of-the-art knowledge, literature, personnel, and other resources.

- Identify and acknowledge potential barriers to success to nurture the constructive dialogue and consensus necessary to carry-out goals.
- Identify the processes that can drive sustainability, including the day-to-day decisions and procedures that will implement the city's goals both incrementally and in the long term. These tools include development guidelines, capital budgeting, the comprehensive plan, zoning, subdivision regulations, and codes.
- Maintain open lines of communication with the public while ensuring the process remains accessible and flexible. Public input can provide constructive, grassroots insight about necessary changes.
- Finally, document and publicize all results and successes, and recognize those who participated in the process.

By creating a process that allows for flexibility and adaptation, the city has a mutually agreed-upon set of goals and a map for getting there. The result of an interactive, participatory democracy is a higher quality of life for residents, a more effective use of resources, and economic development that will sustain the city long into the future (Geis & Kutzmark, 1995).

Social Responsibility

Potentially, the most crucial force in creating sustainable cities is a transformation of basic values. Sustainability will never occur with current outdated perceptions and values of unqualified growth and materialism. These need to be replaced with democratic participation, a sense of community responsibility, and stewardship

(Barber, 1996). Only when perceptions of "community" are changed to include these values can the city translate them into practical methods of planning and development of a city's designated goals (Geis & Kutzmark, 1995). Sustainability should be a goal-oriented process, and will be controversial because it inherently, according to Professor D. Sterman of the Massachusetts Institute of Technology Sloan School of Management, "questions the purpose of society and the relationship between humans and nature, and demands social justice and equity" (Geis & Kutzmark, 1995).

As controversial as sustainability may be, it eventually results in a greater quality of life and more livable, ecologically-responsible cities. Because residents of a city have the greatest stake in its well-being, they should accept greater responsibility for the fate of their regional area through an ethic of stewardship and voluntarism (Grant et al., 1996). Harvard social scientist Robert Putnam describes the network of relationships that transmits values and builds trust as social capital. Social capital remains scarce in today's cities. But under a goal of sustainability, social capital is fostered and enhanced (Potapchuk, 1996).

Sustainable cities value diversity, human and biological. They acknowledge that each are essential to a "thriving social dynamic and web of life." They carry this recognition over to the policies they implement and goals they set. They do not segregate human or natural populations but rather integrate them into the fabric of the community. Furthermore, sustainable cities place a high value on the quality of life of its residents. Because cities first and foremost are for people, the objective of the development process is to improve

the quality of life of its residents, socially, economically, psychologically, and spiritually (Geis & Kutzmark, 1995). The result is an abundance of social capital that works together to develop a recognition of the common good (Potapchuk, 1996).

A Sustainable City Emerges

The result of a "rich cultural life, vibrant public spaces, and the kind of civic architecture that promotes interaction among different social and economic groups" is an environmentally sustainable and socially just community. Such communities share a concern for all their citizens and seek to eradicate poverty and ensure a dignified way of life for all community members. An equal access exists to basic public facilities, such as schools, health care, transportation, and adequate meaningful employment. Sustainable communities are designed to provide equal opportunity to housing by ensuring the full spectrum of housing types. Finally, sustainable communities are democratic. They seek to develop planning processes and decision structures that encourage public participation and involvement by various community groups. Interests of all groups are considered, and all voices in the community are heard (Beatley & Brower, 1993).

CASE STUDIES: TWO AMERICAN CITIES

Sustainable development offers a new hope for American society, as well as a shift in traditional values. However, it is only in it applicability and feasibility that it has true worth. Therefore, it is necessary to look at how sustainable development has successfully been applied in a typical American city. Moreover, it is also

important to look at a city that is the epitome of the American values of materialism, consumption, and growth which lead to resource degradation, loss of public space, social injustice, and destruction of natural landscape. Only then will the path these skewed values lead society down be readily apparent and that sustainable development has the potential to create a more livable future.

Las Vegas, Nevada

Relentless Growth

Just fifty years ago, Las Vegas was a small desert town of 48,000. Now the population has surpassed one million and is continuing to grow with 4,000 to 6,000 new residents arriving each month. This rapid population growth results not only in a construction boom for hotels but also for homes that are relentlessly swallowing up the desert, and for schools (a new one is needed almost every month). Thousands come to Las Vegas to retire, wanting to escape higher taxes and soak in some sun. Others come for the jobs in a place where a valet parker can earn enough to put his children through college ("Boomtown, USA," 1996).

However, what would Vegas be without its tourists, who are coming in the numbers of thirty million, double the number from ten years ago? Amazingly enough, as fast as Vegas can build hotels, the tourists fill them up, with occupancy rates remaining around 90 percent. Each additional hotel room means an extra 320 passengers per year for the Las Vegas airport, now the tenth-busiest nationally ("Boomtown, USA," 1996). Naturally, gambling, or "gaming," is on the rise with 30 percent of American households gambling in 1994, up three percent from the year before. The total number of casino visits

in 1994 increased by 36 percent to a total of 125 million. However, Vegas is no longer only for adults. According to the industry's leaders, the way of the future lies in a combination of gaming, shopping, and entertainment. Las Vegas has responded accordingly with amazing themed, family-friendly resorts. An average-size casino with a children's "edutainment" center can increase a casinos play time by approximately 400,000 hours a year ("The Sky's the Limit: Las Vegas," 1996).

Water and Fossil Fuel Consumption

However, all of Las Vegas' glory does not come without its costs, which the majority of them seem to be laid on the environment. To keep these immense resorts unnaturally green costs $150 a month for just a third of an acre, resulting in a per capital water usage of 343 gallons per day, compared with 200 in Los Angeles (Andersen, 1994). Each new development places further strain on water supplies. In an area whose natural landscape is desert plants, Las Vegas has created tropical paradises. Inside the Luxor is a fake river complete with barges. The MGM Grand has gone further by building an entirely separate amusement park, cramming seven rides, with three involving fake rivers, onto an area a tenth the size of Disney World. In front of Treasure Island is a Mediterranean village with a 65 foot deep lagoon in which a full-scale British man-of-war and pirate vessel stage a battle every 90 minutes (Andersen, 1994).

Las Vegas outstripped its own natural resource infrastructure long ago. In a desert basin that only receives four inches of rain

annually, the water needed to irrigate lawns and golf courses, as well as to fill artificial lakes and lagoons, adds the equivalent of an additional 20 to 30 inches of water per acre. Southern Nevada received only a small share of the allocation of water from Lake Mead when the proportions going to each western state were decided by treaty in the 1930s. Additionally, reckless groundwater overdrafts have resulted in widespread and costly subsidence of the city's foundations. But Las Vegas will not give up its gluttonous patterns and instead threatens its neighbors with its extinction. "Give us your water or we will die," exclaim Clark County officials. What Las Vegas cannot buy from Arizona farmers, it diverts from the Virgin River (a tributary of the Colorado) or steals from the ranchers in Nye and Lincoln counties. Within the near future, it may desiccate central Nevada and southwestern Utah (Davis, 1995).

Las Vegas' overindulgent needs do not end with water. It is also craving fossil fuels. Clark County's transportation director testified that the county has the "lowest vehicle occupancy rate in the country" combined with "longest per person, per trip, per day ratio." Consequently, the number of days with unhealthy air quality is rising dramatically. Like other desert cities, Las Vegas was once a mecca for those seeking the curative powers of the desert air. However, according to the EPA, it now ties with New York City for fifth place in carbon monoxide pollution. Its smog already contributes to the blanket over the Grand Canyon and is beginning to reduce visibility in California's new East Mojave National Recreation Area (Davis, 1995). Finally, the lung-cancer death rate is the second highest in the country (Andersen, 1994)

Dispersed Public Power

Despite a few innovations to Las Vegas's third-generation sprawl (casino-anchored shopping centers), it otherwise commits the "seven deadly sins" of Los Angeles, Phoenix, and Orange County. Thus Las Vegas has:

> 1) abandoned a responsible water ethic; 2) fragmented local government and subordinated it to private land-use planning; 3) produced a negligible amount of public space; 4) refused to use 'hazard zoning' to mitigate natural disaster and preserve landscape; 5) dispersed land uses over an enormous area; 6) accepted the resulting dictatorship of the automobile; and 7) tolerated extreme social and, especially, racial inequality.

Much of its environmental and social problems arise as a result of a dispersion and dilution of public power. The city limit encompass barely a third of the population. Its major assets -- the Strip, the Convention Center, McCarran International Airport, and the University of Nevada -- are all located in an unincorporated township named "Paradise" (Davis, 1995).

The separation of political power results in huge, sprawling county electoral districts that weaken the power of minorities and working-class voters. Power conversely lies in the hands of an invisible government of gaming corporations and giant residential and commercial-strip developers (Davis, 1995). Clark County is faced with rising crime, mental illness, child abuse, and homelessness. The state's welfare case load has rose 54% from 1991 to 1994, due to the influx of people seeking the limited amount of jobs at the casinos (Andersen, 1994). It is also plagued with racial problems as the gaming industry fails to achieve racial or gender equality in its hiring

practices or promotions and inter-ethnic tensions rise between Latinos and African-Americans (Davis, 1995).

Loss of Native Landscape and Public Space

Las Vegas also suffers from development at the hands of the gaming industry and residential developers. They have left enormous empty squares in the built environment typical of the leap-frog development in southern California. Crucial habitat for endangered species like the desert tortoise is destroyed. Meanwhile, they have also destroyed any sense of place for the low-wage workers who live in stucco tenements along the Strip (Davis, 1995). Although the per capita income is the 12th highest in the nation, the electorate voted in 1993 against building and improving parks (Andersen, 1994). Las Vegas has virtually no commons at all, only 1.4 acres per thousand resident, compared with the recommended national minimum of ten acres. Traditional downtown features have instead been strewn across Las Vegas Valley amidst suburbs that stubbornly reject integration with the rest of the city. Furthermore, dependence on the automobile is reinforced. The casino boom of the past decade had made the Strip almost impassable with gridlock from late afternoon to past midnight (Davis, 1995).

Additionally, this failure to preserve native landscape leads to a loss of protection from natural hazards and a loss of benefits to the built environment. The lack of open space and miles of concrete have greatly exacerbated Vegas' summer flash-flood problem, which, in 1992, drowned unsuspecting tourists in casino parking lots. Instead of using creative urban design such as the proper orientation

of buildings, maximum use of shade, and minimization of heat-absorbing "hardscape," it relies simply on universal air conditioning. The result is a combination of waste heat and endless paved surfaces that turn the city into a scorching "heat island" whose nightly temperatures are often 5 to 10 degrees hotter than the surrounding desert (Davis, 1995).

The Epitome of Skewed Values

In the city with the highest suicide rate in the country, materialism and "free" money are not all they've cracked up to be. Las Vegas was created as the "world's first duty-free zone, a place dedicated to the anti-Puritan pursuit of instant gratification -- no waiting, no muss, no fuss" (Andersen, 1994). However, society is a little older and a little wiser. We now know that instant gratification cannot come without cost, whether it be degradation to the environment, social inequality, or a deeper loss of a sense of community and place. The Las Vegas "'miracle' demonstrates the fanatical persistence of an environmentally and socially bankrupt system of human settlement" (Davis, 1995). Thankfully, there is hope for the future as some cities and communities break away from gluttonous patterns of development and seek to revive their settlements through sustainable development.

Chattanooga, Tennessee

A Traditional American City

Chattanooga is an industrial city set in the hills of east Tennessee. Today, with its population of 150,000, Chattanooga is considered a world leader in the movement towards sustainable

cities. However, just 25 years ago, the US Department of Health, Education, and Welfare named Chattanooga America's most polluted city. The history that led to this ranking is the typical path of development of most American cities. Following World War II, better highways and increasing numbers of cars opened the door for suburban migration. Chattanooga's economic infrastructure declined as industry cut back their operations, closed down, or sent their operations overseas. The remaining companies were faced with higher taxes. Additionally, rising crime rates, declining school quality, and racial conflict drove further suburban migration (Frenay, 1996).

However, what differentiated Chattanooga from many American cities was their extreme state of environmental problems. Twenty-five years ago in downtown Chattanooga, air pollution was so thick that residents often had to drive with their headlights on in the middle of the day. Smudges of soot could be found on clothing and around mouths and noses after a walk outdoors. Some kept extra shirts at work (Lerner, 1995). Women's pantyhose were also known to disintegrate in the smoggy air (Robbins, 1997). Per capita cases of tuberculosis were also three time the national average. Additionally, the Tennessee River that curls along the downtown riverfront became so polluted from toxic dumping by coke foundries and chemical factories that the EPA deemed 2.5 miles of it a Superfund site in 1994 (Glick, 1996).

Chattanooga's first attempt at clean-up occurred as a result of 1970 Clean Air Act. The county air pollution control board began to require local industries to install pollution control equipment. By

1988 the city was determined to be "in attainment" of the Act's standards. The tendency towards sustainable development had begun although they were not yet aware of it. $40 million was spent on air pollution control equipment, and a manufacturer of air pollution scrubbers decided to capitalize on the market and located in Chattanooga. Additionally, many of Chattanooga's older industries had already relocated but the abandoned factories sat rusting and deteriorating on the banks of the river as a constant reminder of the city's past (Lerner, 1995).

The Search for Sustainable Development

In 1984 the true efforts for sustainable development were initiated when a non-profit organization named Chattanooga Venture, initially funded by the Lyndhust Foundation, launched "Vision 2000." It was modeled on the experiences of Indianapolis, Dallas, St. Louis, and Minneapolis, all of which to a certain extent had focused inner-city redevelopment initiatives on community input (Lerner, 1995). Vision 2000 involved more than 1,700 citizens representing a wide variety of groups and created a set of 40 goals for the year 2000. Community members were asked to describe their visions for the city's future and establish priorities based on those visions. The 40 goals were set under categories such as "Future Alternatives," "Places," "People," and "Government" (Ward, 1998). By 1992, 37 goals were complete or in process, and ReVision 2000 set 27 new goals at a meeting of 2,600 residents (Robbins, 1997).

Once the city had produced a consensus for a cleaner, greener, safer city with rehabilitated housing and non-polluting jobs, the next

step was to find funding. City officials, Chamber of Commerce members, and residents recruited investors for the public/private partnerships necessary to make the goals a reality. Only a third of the total $800 million was from public funding, including $9 million of state funds from Governor Lamar Alexander (Lerner, 1995). Major areas of focus included the downtown riverfront area, a new South Central Business District, and Alton Park/Piney Woods.

A Renewed Downtown

The first step to renovating the riverfront was to remove the derelict warehouses and piers that blocked access to the Tennessee River. New fishing piers as well a shoreline park complete with hiking trails and bike paths took their place (Frenay, 1996). This five-mile park came to be called The Riverwalk and is ultimately planned to extend twenty-two miles along both banks of the river, and is only one element of an ambitious plan to create a seventy-five mile network of greenways throughout the city. Additionally, the Walnut Street Bridge was remodeled as a pedestrian walkway instead of building a major highway into the downtown to avoid turning the downtown into a "concrete wasteland" (Lerner, 1995)

Another goal for the downtown was to revive it economically. Chattanooga decided to emphasize a slower pace for the downtown and focused on the renovations of small hotels, inns, bed-and-breakfasts, and restaurants around the railroad station and near the new convention center. They also made great efforts to renovate the old Tivoli Theatre and other historic buildings. Additionally, to make the downtown more visually pleasing, fountains were installed,

pocket parks planted, and street vendors and musicians welcomed (Lerner, 1995). Possibly the most important addition to the downtown was the building of the freshwater Tennessee Aquarium featuring the river's ecosystem. As a tourist attraction, it generated an estimated $133 million to the city in 1992, and has drawn an average of 1.3 million visitors annually (Glick, 1996).

Measures were implemented to reduce the environmental damage caused by downtown development. Sidewalks were rebuilt with beveled paving bricks to allow stormwater to run into the chinks between them in order to limit the amount of water in the city's sewer system. The city planted trees along the streets and around parking lots to provide shade, clean the air, and moderate temperatures (Lerner, 1995). Furthermore, efforts to reduce pollution, protect water quality, and control erosion have been established throughout Chattanooga. A reinforced vegetative cover has been put in all channels, such as roadside ditches, which reduces the velocity of water. The city is using erosion control matting that is locally manufactured by Synthetic Industries. In low-velocity channels, a biodegradable, open-weave matting is placed on top of a layer of seed, fertilizer and mulch. In area with a high volume of water, a permanent, 3-D matting is installed after seeding. As of 1996, no reseeding had been necessary despite several record rainfalls (Scott, 1996).

Finally, and potentially the most significant change to the downtown has been the transition to electric buses. In 1991, then-Mayor Gene Robert gave the Chattanooga Area Regional Transit Authority (CARTA) the duty of finding a pollution-free method of

public transportation. They looked to Joe Ferguson, an area businessman, for the possibility of using electric buses. Ferguson responded that, technologically, electric buses were doable, however, there was no place to buy them. Since buying them was not possible, Ferguson decided to build, and created Advanced Vehicle Systems (Ward, 1998).

Chattanooga's original order of twelve buses remains the largest order globally for battery-powered buses. The Chattanooga-based company now has close to 70 buses operating throughout the US (Ward, 1998). Advanced Vehicle Systems is the world's largest manufacturer of electric buses and is expanding internationally. In 1996 people from 33 countries came to AVS to learn more about their buses, with an order of 15 from Costa Rica. To make these electric buses successful in Chattanooga, the city invested $20 million in three interceptor garages where riders can park their cars before boarding (Ward, 1998). The ride is free, financed by the garages. The buses carry approximately a million passengers a year on the four-mile route and employ 35 local residents (Lerner, 1995).

A New Business District

Chattanooga's current focus is on the new South Central Business District. The plan is to develop this crumbling, abandoned industrial area into an environmentally advanced commercial development. The plans were developed through a collaboration of 130 stakeholders, including local residents, commercial-property owners, city officials, urban planners, and architects. The eventual goal is to create a mixed-use community of residential neighborhoods

and eco-industrial zones with zero-emissions so that employees can live near their workplace. A new stadium has been built with a parking complex of wide, tree-lined side streets, edged with a perforated concrete that allows grass to grow. Additionally, there are plans for a "living machine" treatment center for sewage, wastewater, and contaminated soils that run into interconnected tanks filled with wetland plants, algae, micro-organisms, snails, trees, and fish that filter and break down the wastes (Lerner, 1995).

A Long Road Ahead

Despite all of Chattanooga's successes, their prosperity is shadowed by an industrial wasteland just south of downtown in the primarily black communities of Alton Park and Piney Woods. For nearly half a century this area was dominated by foundries, chemical plants, and other industries piling waste into landfills and dumping it into the Chattanooga Creek. Most of the factories have been abandoned but they've left behind 42 known or suspected hazardous-waste dumps, 13 of which are state of federal Superfund sites. A 1991 report on South Chattanooga prepared by Greenpeace and the Environmental Research Foundation lists several playgrounds and recreational areas on or near dump sites and notes that "most residents of Alton Park and Piney Woods live within a mile or two of several suspected chemical dumps."

Risk assessment is currently taking place in the area and fencing, warning signs, and a public health survey have also been implemented. Milton Jackson, an Alton Park resident and the president of STOP (Stop TOxic Pollution), acknowledges that some

progress has been made but states that there has not been any real concentrated effort at remedying the situation by the state or the local business community. City Councilman David Crockett recognizes that its not enough to just clean up the creek, "we need to recognize that there's a whole neighborhood there and that there's got to be work for the people who live there" (Frenay, 1996).

A Model of Sustainability

Chattanooga has become a model for sustainable cities, but its task at Alton Park and Piney Woods indicate they still have a long way to go *and* that sustainability as goal for global society will not come without much dedication, effort, and patience. However, the mountains Chattanooga has conquered cannot go unnoticed. To date they have completed two-hundred and twenty-three projects and programs, created 1,300 permanent jobs and more than 7,000 temporary construction jobs. All of their effort has generated a total financial investment of almost $800 million (Ward, 1998).

Chattanooga's success to a remarkable extent can be attributed to community involvement. Eleanor Cooper, executive director of Chattanooga Venture from 1990 to 1992 explains that residents realized that if they wanted a better urban environment, they would have to put their own sweat and blood into it. "People felt as if decisions about the city were made by a small elite. So when we said everyone can contribute to shaping the city's future, suddenly a whole lot of people with energy and good ideas came into the process." That commitment has remained strong throughout the development process. Judge Walter Williams makes environmental

violations a priority on his city court docket one day out of every week. A non-profit group, Orange Grove, trains people with mental disabilities to work in the city's recycling center. Finally, inner-city children frequently visit the urban Greenway Farm (Lerner, 1995).

Chattanooga has become a model of how environmental protection and economic development can coexist, because of, rather than despite each other (Glick, 1996). But, as explained by Crockett,

> In the end, the redesign of Chattanooga is not about the projects -- the electric buses, the stadium. The real essence is the process of involving the community, of understanding fully how each piece affects everything else. Today our kids are learning sustainability lessons in school. Then they come out into the job market and work in industries that are doing it. They're getting life skills, they're learning about the redesign, and, like in an ecosystem, we're closing the loop -- offering a life that will keep those kids here (Frenay, 1996)

In 1994, the President's Council on Sustainable Development recognized this achievement when they held their meeting in Chattanooga and Vice President Gore praised it as a place that "has undergone the kind of transformation that needs to happen in our country as a whole" (Lerner, 1995).

SUSTAINABLE DEVELOPMENT: A GOAL FOR AMERICAN SOCIETY

Applying Sustainable Development

Just as America's consumption patterns would lead the rest of the world into environment disaster, so too would Las Vegas' gluttonous emphasis on growth and materialism if American cities looked toward Las Vegas as a model for the future. It is true that at

first glance, Las Vegas appears as a pillar of success. However, by looking a little deeper, it becomes readily apparent that unchecked growth and consumption will only eventually lead to disaster. Therefore, a better model for the future of American cities is Chattanooga, Tennessee, where a shift in values has built a more sustainable, livable city.

Many constraints arise when a city tries to implement another city's program or a nation attempts to mimic another nation's policies. One region attempting to transfer another's program is often limited economically by a lack of resources and capital. Additionally, the substitutability, the scale, and the complexity of a program many hinder its success (Rose, 1993). However, one of the blessings of sustainable development, because it is not a specific program or plan, is its ability to be designed and applied appropriately to a particular city based on the city's needs and resources. A city has the ability to choose to take on a large-scale, city-wide plan for sustainability as Chattanooga has done, or to focus on a small area of the city as Boulder, Colorado, has done through its "solar access" law (Ward, 1998).

Sustainable development's most limiting factor is its shift away from traditional, but destructive, American values. Although Chattanooga's experience indicates sustainability can not only rebuild cities but also revive them, it will be frightening to break away from the destructive values that have guided American society for so long. Therefore, for cities to become more sustainable, an emphasis must first emerge at the national level. This has already begun with the creation of the President's Council on Sustainable Development

(PCSD) in 1993. The council formed as a two-year partnership of government agency heads, corporate leaders, and environmentalists to advise the president and develop a "national sustainable development action strategy that will foster economic vitality.

A National Focus

The PCSD created eight task forces for the following goals: Principles and Goals, Public Linkages, Natural Resources, Eco-Efficiency, Sustainable Agriculture, Energy and Transportation, Population and Consumption, and Sustainable Communities. The Sustainable Communities Task Force was the largest task force and focused on economic development and jobs, housing and land use, financing, planning and participation, social infrastructure, and transpiration and infrastructure. Following recommendations made by the eight task forces, on March 7, 1996 President Clinton announced the release of PCSD's Sustainable America report, which he stated has "shown us the power of partnership" and how "we can pursue simultaneously the goals of economic prosperity, social equity, and environmental quality" when government, business, and environmentalists work together "in good faith" (Barber, 1996).

Despite this positive step towards national sustainable development, the PCSD has failed to make significant changes. First, there has been very little attention by the media and therefore a lack of awareness about the council's existence and a thus a lack of support for it. Additionally, the public's lack of understanding about the concept of sustainable development has dampened initial enthusiasm about the council. Finally, with a Congress hostile to

environmental regulations, President Clinton has given little public attention to the goals of sustainable development (Barber, 1996).

However, despite a slow start, the PCSD has made a significant step for American society solely in that it

> initiated a formal dialogue among corporations, environmentalists, labor unions, and civil rights groups about sustainable development in the United States. For corporate leaders, to acknowledge the importance of environmental protection and social equity to their goals of economic development and to publicly embrace the concept of sustainable development marks an important historical step (Barber, 1996).

The next step towards national sustainability is for the PCSD to focus on encouraging the development of sustainable cities. This can be carried out by offering financial support, information, and guidance from a variety of experts. Initially, the council may want to focus its efforts on a few pilot cities and then expand as results prove positive.

THE PURSUIT OF SUSTAINABILITY

A sustainable society is characterized by the degree to which environmental and social considerations are incorporated into decision-making in the *public* and *private* sectors. Because society, like the earth's biosphere, is dynamic, its success will be determined by its ability to constantly adjust and change in response to the interaction of man and nature (Konvitz, 1996). Sustainable development will only be achieved if there is collective value change. However, a breakaway from traditional values is difficult as

America's institutions including the market economy, business, and cities thrive on these values. Much overlapping exists between these institutions. A change in one will foster change in another, and none can make significant change without the others, or without the drive to change.

Therefore, to begin the pursuit of national and global sustainability, an attitudinal shift must occur that recognizes the value of natural and social capital to human welfare. Organizations such as the President's Council on Sustainable Development and other non-profit groups can spark this change, and cities like Chattanooga can serve as a model for other cities to follow. As America shifts its focus towards sustainable development, and away from materialism and overconsumption, people will begin to see a different quality of life emerging, one that emphasizes social justice and environmental protection. Moreover, society's traditional driving forces such as competition will still dominate but will instead create environmentally and socially-just products, buildings, and landscapes. Just as the natural world recognizes its interdependence, so must our society in its actions. Only then will we meet our potential to achieve a more environmentally-responsible, socially-just, democratic, livable, sustainable world.

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